senses of sight and sound. For VR to be effective and to seem real, movement must be smooth. Current VR systems often cause motion sickness because the lack of precise PLD causes motion sickness or, more generally, is uncomfortable. While VR systems can easily be imagined for gaming purposes, the applications are far more expansive. For example, VR systems can be used to give tours of facilities, housing, etc., to facilitate strategic decision-making. A system with the hardware described herein could be combined with a database containing imagery and accurate distance or location information (collectively or individually, "imagery information"). Accordingly, a precise VR system would accurately display views based on the precise location information of the user in relation to overlaid imagery information. This would allow a home buyer, for example, to virtually tour a home to decide whether to actually visit a home that is for sale or even whether to purchase a home of facility yet to be constructed. If a portion of a VR system were to be replaced by a high speed digital processor and software, the embodiment of the invention would include at least one processing core, a memory for holding computer instructions wherein, when executed by the at least one processing core, performs the described and variations thereof for VR.

Augmented Reality (AR)—AR systems are similar to VR systems except that imagery information is displayed and overlaid with actual scenery viewed via a lens wherein the imagery information is sized or scaled and oriented in response to the precise location information of the user. As before, the precise location information of the user allows imagery information to be scaled in smooth manner that is more pleasing and real to a user.

Indoor Laser Tag and other gaming systems—Laser tag systems and other similar gaming systems are similar to the VR systems described above wherein the imagery is displayed in relation to the precise location information of the user as well as the precise location information of the other users. Interestingly, individuals playing laser tag would not be required to be collocated because data transmitted over the Internet could be merged with a VR gaming system to virtually place the users proximate to each other for the game whether the game is laser tag or other game (e.g., racing game, fighting game, etc.). As before the technology may comprise dedicated hardware as described herein, a processor and software based system, or a combination of the two.

Motion Capture—Having precise location information may also be used to capture motion for many applications including remote coaching, gaming, simulated group activities, etc.

Light/Camera and, more generally, equipment tracking—Precise equipment tracking may be had to allow automated and manner equipment collection. With respect to lighting and cameras, precise location tracking may be used to direct lighting and camera equipment in a precise direction for countless applications including for surgical and other medical purposes. Furthermore, precise location and position information may used in conjunction with a guidance system to precisely aim a camera, a lighting system, a laser, a projectile device (e.g., a firearm or other weapon) in addition to knowing the precise target coordinate/position/location.

Speaker Tracking—precise location and position information may used to accurately determine a speaker for purposes of identification, for example, in a large group of people and/or for filming purposes for aiming and zoom calculations for a camera. More generally, precise location and position information may used within an organization to quickly locate a specific person (e.g., a doctor, nurse or surgeon) or a piece of equipment (a specialized device that is in short supply for any reason including cost).

Fitness Tracking—Fitness trackers are known, but the accuracy of the results are sometimes suspect because of a lack of precise location and position information, especially when indoors. Moreover, accurate motion tracking allows for more precise energy consumption calculations (e.g., calories consumed).

Autonomous Robots/Drones—precise location and position information may used not only to accurately determine a location of an object upon which the robot or drone performs a function but also to accurately determine the location and position of the robot or drone such that the actual relative placements are accurately known. For example, a robotic device in an inventory facility must know its own precise location and position information as well as an inventory item to find and retrieve the item.

Military & Defense—precise location and position information may used in countless applications including training, weapons delivery, targeting etc. For example, helmet mounted sight systems, with precise location and position information may used to slew radar systems and other targeting systems to the precise point that a user or pilot is identifying by the orientation of his helmet. Accordingly, a pilot may more quickly designate a target to release ordnance and subsequently retreat to minimize risk of being shot by enemy systems. Such targeting systems may be for major weapons systems (tanks, ships, bombers and fighter airplanes) as well as personalized weapons systems. In one embodiment, a precise location and position determination system is used with a mobile weapons system that, in one embodiment, may be carried or worn by an individual. Position determination systems may also be used for tracking for teaching purposes (e.g., tracking movement for weapons training, etc.).

While the invention is susceptible to various modifications and alternative forms, specific embodiments thereof have been shown by way of example in the drawings and detailed description. It should be understood, however, that the drawings and detailed description thereto are not intended to limit the invention to the particular form disclosed, but, on the contrary, the invention is to cover all modifications, equivalents and alternatives falling within the spirit and scope of the present invention as defined by the claims. As may be seen, the described embodiments may be modified in many different ways without departing from the scope or teachings of the invention.

The invention claimed is:

1. A method performed by a tag/processor device for estimating its probable location, comprising:

receiving, via an ultra-wide band communication transceiver, ultra-wide band RF signals containing locations of each of at least three anchors;

determining, via a processor, ranging information of each of at least three anchors by transmitting and receiving ultra-wideband communication messages via the ultra-wide band communication transceiver and determining an associated transmission time of flight between the tag/processor device and the at least three anchors;

determining a distance between the tag/processor device and the at least three anchors from the determined ranging information;

determining an altitude of the tag/processor device based on temperature and pressure data;